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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/361,458	07/27/1999	JONATHAN H. MEIGS	30-4590	5541

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EXAMINER

EASTHOM, KARL D

ART UNIT	PAPER NUMBER
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2832

DATE MAILED: 03/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/361,458

Applicant(s)

MEIGS ET AL.

Examiner

Karl D Easthom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11,30-35 and 37-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11,30-35 and 37-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 37-40, 43, and 48 are rejected under 35 U.S.C. 102(e) as being anticipated by Obrien. Obrien discloses the claimed invention at Fig. 2 with copper layer 21 (cl. 38) and resistive layer 22, and board 24 for claim 48. The silane treatment of the conductive copper layer is disclosed at col. 5, lines 20-40, where the surface of the layer 21 is copper at line 65 and is treated in the passage noted, with the resistive composite at col. 6, lines 36-47. For claims 39-40, see col. 6, lines 35-50. In claim 43, the area will be met with any mixture.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 11, 30-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carbin in view of, or with, Grazen and Hunt, further in view of Ameen or Obrien. Carbin discloses the claimed invention except the alumina oxide and nickel particles and the silane roughening treatment. Grazen discloses nickel and alumina as a good conductor material (electrical contacts, electric relays) in the claimed range with the articles having good wear resistance, corrosion resistance, alloy strength, high temperature resistance, and a host of advantages at cols. 1-2. Hunt discloses at col. 24, lines 24-67, the same mixture of alumina and nickel as a useful resistor in a circuit board on a copper foil similar to the resistor and circuit board of Carbin noted next. Carbin discloses that metals codeposited with nonmetals, similar to that of Grazen and Hunt, are typical of the prior art for use as resistors in circuit boards, citing US 4808967 at col. 4, lines 15-21, teaching a nickel-phosphorous resistive layer, and also specifically teaches use of nickel as a conductive layer¹. Carbin also teaches that deposition can occur on either the matte side or shiny side at col. 5, lines 5-32, thus suggesting that any resistive or conductive materials such as that of Grazen or Hunt are applicable for deposition on the shiny side. That is, Carbin teaches at the noted passage and see cols. 9-11 that there are only two choices for deposition, the shiny side or the matte side, teaching a copper layer in a circuit board (for claims 38 and 48) with advantages for deposition on the shiny side including the ability to better etch the conductor layer - see top of col. 11 due to the deeper pits in the matte side. Carbin teaches that the shiny side lacks adhesion to a substrate due to lack of roughness, and employs an adhesion layer on the shiny side prior to a subsequent metal deposition that creates roughness (that is transferred to the deposited metal layer -see col. 5, lines 50-57) for

¹ Phosphorous is a known resistance increasing additive, see Clouser et al., similar to the function of the alumina.

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better adherence, suggesting the claims. Ameen discloses that one way to make the surface of either the matte or shiny side rougher is to use a silane treatment, so than it would have been obvious to use the known method where Carbin teaches using the method. Obrien discloses treatment of a copper foil to adhere a resistor thereto at col. 5. It would have been obvious in view of Grazen and Hunt to employ the known resistive materials suggested there in the circuit board of Carbin on the shiny side for the purpose of forming a known resistor composition having the superior properties suggested, and so that the copper layer can be etched more easily, and to use the silane treatment of Ameen or Obrien where Carbin teaches using a roughening treatment to enhance adhesion.

Assuming arguendo for the dependent claims that the process limitations render the product distinct (and if not then the required modifications are not required) , for claims 31 and 33, the claimed temperature range is disclosed at col. 3, lines 50-75 of Grazen where the claimed temperature range is required for the materials employed so that would have been obvious. Grazen suggests and discloses the claimed particle size, g/l, and PH of claims 30-33 (after conversion of units from oz/gal for nickel) at col. 4, lines 50-75 chosen for the ability to circulate in the solution rendering that choice also obvious. For the density of alumina, the alumina additive is disclosed at Grazen col. 5, lines 25-35 as varied over a wide range depending on the desired result. The amount in g/l is further suggested in the examples at col. 4 Hunt teaches, and it is well known as evidenced by art in the record, that the relative amount of metal to additive varies the resistivity so that it would have been obvious to employ any range to obtain any resistance, meeting claims 11, 43, , and 47. The materials of Hunt and Degrazen also meet claims 37, 39-42, 45.

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5. Claims 37-45 and 47-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carbin in view of Hunt, further in view of Ameen or Obrien et al. Carbin discloses the claimed invention as noted above except the nonconductive material and the silane roughening treatment. Hunt discloses at col. 24, lines 24-67, nonconductors and conductors as a mixture, including the mixture of alumina and nickel as a useful resistor in a circuit board similar to the resistor and circuit board of Carbin noted next (thus meeting claims 39-45 and 47). Carbin discloses that metals codeposited with nonmetals, similar to that of Hunt, are typical of the prior art for use as resistors laminated with copper layers in circuit boards (meeting claims 38 and 48, citing US 4808967 at col. 4, lines 15-21, teaching a nickel-phosphorous resistive layer, and also specifically teaches use of nickel as a conductive layer). Carbin teaches adhesion treatment to adhere conductors to a substrate due to lack of roughness, and employs an adhesion layer that creates roughness -see col. 5, lines 50-57 for better adherence, suggesting the claims. Ameen or Obrien teaches as noted above, the particular silane treatment for roughness so that it would have been obvious to employ that for reasons noted. For claims 43, 44 and 47, the area and resistivity are met by forming the composition of particles, or the resistivity is obvious as a known variable controlled by conductor to nonconductor ratio.

6. Claims 37-44 and 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carbin in view of Kakuhashi 52-181559 (English translation) (see note 1), further in view of Ameen or Obrien et al. Carbin discloses the claimed invention except the silane treatment and non-conductive material. Kakuhashi discloses the material as a good resistor for electroplating circuit boards at page 3, and useful to replace the nickel/phosphorous taught by Carbin in order to make a larger sheet resistance, so that it would have been obvious to employ same. For the

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discussion of Ameen, Obrien et al and Carbin relating the silane treatment see the remarks above, not repeated here for brevity but incorporated by reference. For claims 39-44, the Kakuhashi materials meet the claims. For claims 38, 46, and 48 Carbin as noted above or Kakuhashi at example 1 discloses the copper foil and electrodeposition and substrate.

7. Applicant's arguments filed 3/15/04 have been fully considered but they are not persuasive or are moot. Applicant argues there is no suggestion for the combination because Carbin does not deal with resistors, but only mentions them. This is not correct where the teaching indicates that either resistors or conductors can be employed. Further, the specific resistor comprises nickel, and one of the conductors is nickel, with the only difference being the addition of a small amount of alumina. The alumina and nickel combination is a well known resistive material. Applicant argues that Carbin d al. goes no further than teaching that a copper foil surface can be treated to improve adhesion of another metallic layer to the copper foil. This is only partly true, for the adhesion treatment also promotes adhesion to the substrate. Hence the addition of a nonmetal to the metal layer does not alter the teaching, because there is no teaching that the nonmetal will promote adhesion so that adhesion treatment is not required, so that adhesion promotion is still desired. Applicant argues that Carbin does not teach addition of a nonmetal with a metal, but this is not correct because phosphorous is a nonmetal, and nickel is a metal, and Carbin teaches it is known to apply that to a copper surface in a circuit board. As to the resistivity limitations, same are inherent in the proper proportions of the claimed materials and obvious for the reasons noted.

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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl D Easthom whose telephone number is (272) 571-1989.

The examiner can normally be reached on M-Th, 5:30AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on (272) 571-1989. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Karl D Easthom
Primary Examiner
Art Unit 2832

KDE